

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

• • R E M A R K S / A R G U M E N T S • •

The Official Action of July 1, 2003 and Advisory Action of November 6, 2003 have been thoroughly studied. Accordingly, following remarks, considered together with the changes made herein for the claims, are believed to be sufficient to place the application into condition for allowance.

By the present amendment, the inadvertent typographical error in claim 5 which resulted in the word "mounting" to be spelled "monitoring" has been corrected.

Claims 5-8 are pending in this application.

On page 2 of the Official Action the Examiner has objected to claim 5 due to an inadvertent typographical error in claim 5 which resulted in the word "mounting" to be spelled "mounting." The Examiner has requested that "the word monitoring be substituted with mounted pursuant original its claim." This requested correction has been made by way of the present amendment.

Entry of this change to claim 5 is respectfully requested and deemed proper after final rejection.

Claims 5, 6 and 8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over "Glenn (US 6,166,430)" in combination with U.S. Patent No. 6,333,252 to Jung et al. and U.S. Patent No. 5,900,676 to Kweon et al.

Appl. No. 09/837,022
Response, Dated December 18, 2003
Reply to Office Action of July 1, 2003

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Glenn and Jung et al as applied to claim 5 and further in view of Japanese reference No. 2001-024001 to Matsushita.

For the reasons set forth below, it is submitted that the rejections of the claims based upon the prior art of record are improper and therefore, each of the outstanding prior art rejections should be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

Initially it is noted that U.S. Patent No. 6,166,430 issued to Yamaguchi not Glenn.

U.S. Published Patent Application No. 2002/0100165 to Glenn was cited by the Examiner on the Form PTO-892.

It appears that the Examiner intended to refer to U.S. Published Patent Application No. 2002/0100165 to Glenn in the prior art rejections of the claims.

Applicant will respond to the rejections on the basis.

The Examiner has relied upon Glenn as disclosing"

a method of manufacturing a plurality of semiconductor devices comprising steps of forming an electrodeposition frame (via etched metal; Par. 0037, 0038, Line 1) on a flexible substrate (10), said electrodeposition frame having first metallic layers (20) and second metallic layers (24) for external extension being patterned, wherein the first metallic layers are thicker than said second metallic layers so that the rear surfaces of the first and second metallic layers are flush with the bottom of the resin, contiguously mounting a semiconductor (28) with inherent electrode pads thereon said first metallic layers, wire bonding (29) the electrode pads to said second metallic layers, resin-sealing (30) said semiconductor element mounted on said electrodeposition frame is resin sealed with said semiconductor and using the substrate as a lower die, removing said substrate (Par 0053) to provide a resin sealing body; cutting said second metallic layers (Fig. 11, 13) and cutting a resin sealing body into individual semiconductor devices (Par 0056).

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

The Examiner concedes that "Glenn does not appear to disclose that said substrate is a metallic flexible substrate..."

The Examiner has accordingly relied upon Jung et al. as utilizing "an inherently flexible metallic substrate (260)."

In combining the teachings of Glenn and Jung et al. the Examiner takes the position that:

It would have been obvious....to form the substrate of Glenn as a metallic substrate as an alternative process in order to encapsulate a semiconductor chip with exposed leads.

In addition the Examiner states that:

Furthermore, it would have been obvious....to use metallic substrate as an alternate temporary substrate since it has been held that to be within the general skill of a worker in the art to select known material on the basis of its suitability for intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416 (1960).

First, it is pointed out that the Examiner's proposed combination of Glenn and Jung et al. is improper under U.S. Patent Law because it is completely contrary to the express teachings of Glenn.

As held by the Patent Office Board of Appeals and Interferences in *Ex parte Hartmann*:

References cannot properly be combined if effect would destroy invention on which one of reference patents is based. *Ex parte Hartmann*, 186 USPQ 366 (PTO Bd App 1974).

It is important to fully consider the teachings of Glenn.

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

In paragraph 0004 Glenn introduces the invention in the context of disadvantages associated with the prior art by pointing out that the prior art has:

...foreseeable disadvantages. For example, the use of the metal temporary substrate and low-melting point alloy layer increase costs and manufacturing difficulty.

In paragraph 0006 Glenn discusses further disadvantages with the prior art stating:

First, the use of acid to dissolve the remainder of the copper plate after encapsulation creates a significant possibility of contamination, since such acids are generally regarded as dirty. Second, the package is subject to failure, because the leads are attached to the package only by the bond wire and by the adhesiveness of the encapsulant to the inner surface of the plated pocket. Thus, the leads could easily be detached from the bond wire and package body.

In paragraph 0007 Glenn teaches that:

Accordingly, there is a need for a small and reliable package that is easier and less expensive to manufacture than prior art packages.

In paragraph 0010 Glenn teaches:

The present invention overcomes the disadvantages of the prior art by, among other things, the use of an inexpensive plastic sheet as a base for forming the packages

Glenn utilizes a plastic substrate having an adhesive surface which is exemplified by the use of adhesive tape in paragraph 0008. The use of such a substrate allows Glenn to achieve a lower cost and a method of removing the substrate without exposing the packaged semiconductor device to potentially harmful etching solutions.

As relied upon by the Examiner, Jung et al. teaches the use of a metallic substrate 260.

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

As taught by Jung et al., substrate 260 is removed at the end of the fabrication process "utilizing an etching agent."

It is submitted that it would go against the express teachings of Glenn to modify Glenn to include the metallic substrate of Jung et al. as the Examiner suggests.

In response to the Examiner's stated basis that:

It would have been obvious...to form the substrate of Glenn as a metallic substrate as an alternative process in order to encapsulate a semiconductor chip with exposed leads.

It is noted that Glenn teaches advantages associated with utilizing a plastic substrate over a metallic substrate.

Accordingly, plastic and metallic substrates cannot be considered equivalents or alternatives in the present situation.

As held by the court of appeals in *In re Wesslau*:

It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. *In re Wesslau*, 147 USPQ 391 (CCPA 1965).

Under this holding, the Examiner is required to fully consider the reasons as to why Glenn utilizes a plastic substrate.

When fully considering the teachings of Glenn, it becomes "obvious" that Glenn expressly avoids the use of a metallic substrate.

Accordingly, the express teachings of Glenn do not support the Examiner's position that:

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

It would have been obvious....to form the substrate of Glenn as a metallic substrate as an alternative process in order to encapsulate a semiconductor chip with exposed leads.

The Examiner's second basis for modifying Glenn in view of Jung et al. was stated as follows:

Furthermore, it would have been obvious....to use metallic substrate as an alternate temporary substrate since it has been held that to be within the general skill of a worker in the art to select known material on the basis of its suitability for intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416 (1960).

In re Leshin involves a situation in which the Board of Patent Appeals and Interferences upheld a rejection on the basis that:

...mere selection of known plastics to make container-dispenser of a type made of plastics prior to the invention, the selection of the plastics being on basis of suitability for intended use, is obvious.

In *In re Leshin* the prior art taught various plastic materials and the appellant argued that he "had to select them for his particular purpose" after conceding that the "the plastics he uses are well known"

In the present situation the Examiner is trying to apply the holding of *In re Leshin* to a situation in which the primary reference teaches a plastic substrate in order to overcome disadvantages associated with the prior art use of metallic substrates, and the secondary reference teaches a metallic substrate.

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

This is not a case of selective use of similar materials as in the case of *In re Leshin*. Moreover, Glenn expressly teaches function differences and disadvantages associated with metallic substrates verses plastic substrates.

Therefore the holding in *In re Leshin* does not support the Examiners' stated position on obviousness and the Examiner's second basis for concluding that applicant's claimed invention is obvious over Glenn in view of Jung et al. is unfounded.

It is noted that in Glenn the lead frame and plastic substrate are attached to each other by an adhesive material. However, after attachment, peeling may occur which would allow the sealing resin to seep in between the lead frame and the plastic substrate. In such a case, the seeped in sealing resin cannot be removed and therefore poor conductivity may occur.

In contrast to Glenn, in the present invention the Ni (metallic layer) is formed by electrodeposition so that no gap is formed between the Ni layer and SUS. Therefore, the sealing resin cannot seep in between the Ni layer and SUS.

In Glenn the problem of the sealing resin seeping between the lead frame and plastic substrate can only be achieved by increasing the adhesive strength of the polyimide adhesive tape. This causes additional problems because after the plastic substrate is removed, the additional adhesive must also be removed. This adds an additional process step and increases costs.

The Examiner has relied upon Kweon et al. as teaching the use of deposited metallic thin film portions on first and second metallic layers that are exposed from a rear surface of a resin body.

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

In combining the teachings of Kweon et al. with those of Glenn and Jung et al. the Examiner states that:

It would have been obvious....to deposit thin film portions of the first and second metallic payers that are exposed from a rear surface of said resin sealing body in order to provide electrical and mechanical connection as taught by Kweon.

The Examiner's further reliance upon Kweon et al. does not overcome the fact that the combination of Glenn and Jung et al. is improper under 35 U.S.C. §103.

The Examiner has relied upon Matsushita as disclosing cutting through a sealing resin and a centerline of second metallic layers.

The Examiner's further reliance upon Matsushita does not overcome the fact that the combination of Glenn and Jung et al. is improper under 35 U.S.C. §103.

In the Advisory Action of November 11, 2003 the Examiner has stated that:

...applicant has not provided extrinsic evidence that replacing the substrate of Glenn with another material will destroy the invention.

In response to the Examiner's position and suggestion for applicant to submit extrinsic evidence, a Declaration by Mr. KIMURA is being submitted herewith under the provisions of 37 CFR §1.132. (An unsigned copy of the KIMURA Declaration is submitted herewith and a signed copy is being obtained for submission in due course).

The KIMURA Declaration provides a technical explanation from someone who is qualified as having ordinary skill in the art, as to the differences between applying metal layers on metal and plastic substrates and electrodeposition techniques for fabricating semiconductor devices.

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

The technical facts set forth in the KIMURA Declaration support applicant's position that it would not have been obvious to modify Glenn in a manner which involves substituting the plastic substrate of Glenn for the metal substrate of Jung et al.

From the facts in the KIMURA Declaration considered in light of the teachings of Glenn, one skilled in the art can readily conclude that Glenn does not teach electrodeposition at all, let alone forming an electrodeposition frame on a metal substrate.

Rather, Glenn teaches that "metal layer 16 may be applied by sputtering or chemical vapor deposition."

Moreover, Glenn does not recognize or appreciate, or is in any concerned with the differences in contact strength between metal layers on plastic substrates (deposited by sputtering or CVD techniques) and metal layers electrodeposited on metal substrates as explained in the KIMURA Declaration.

The Examiner's combination of the prior art is based upon the premise that there is no difference between using a plastic substrate in Glenn or modifying Glenn to have a metal substrate.

It is submitted that the facts in the KIMURA Declaration establish that there are significant differences between using a plastic substrate and a metal substrate in the fabrication of semiconductor devices.

Accordingly, it is submitted that the record, including the teachings of the prior art and the KIMURA Declaration, support applicant's position that the combination of Glenn and Jung et al. is

Appl. No. 09/837,022
Response, Dated December 18, 2003
Reply to Office Action of July 1, 2003

not obvious under 35 U.S.C. §103, and that applicant's claimed invention is patentably distinguishable over the prior art.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicant's claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.


It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved; the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

Appl. No. 09/837,022
Response. Dated December 18, 2003
Reply to Office Action of July 1, 2003

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,



Michael S. Gzybowski
Reg. No. 32,816

BUTZEL LONG
350 South Main Street
Suite 300
Ann Arbor, Michigan 48104
(734) 995-3110

105160.1